DOCUMENT RESUME

ED 052 028 SE 011 346

AUTHOR	Wilson, John Oliver
TITLE	Quality of Life in the United States--An Excursion into the New Frontier of Socio-Economic Indicators.
INSTITUTION	Midwest Research Inst., Kansas City, Mo.
REPORT NO	MRI-1041
PUB DATE	68
NOTE	48p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Economics, *Research, Social Environment, Social Factors, *Social Sciences, *Socioeconomic Influences, Statistical Analysis

ABSTRACT

The development of a set of social indicators with which to assess interregional differences in the quality of life in the United States is the goal of this report. Prompted by the observation that there are increasing signs of discontent with the continued use of traditional measures of economic, political, and social progress-per capita income and gross national product-Mr. Wilson states the national income and product accounts were not conceptually designed to measure changes in our total socio-economic environment. For these reasons it is imperative the new frontier of social indicators be explored. The concept of social indicators as aggregate or representative welfare measures is presented and the procedure for developing them is reviewed. States are selected as the geographical unit of analysis and the general areas of social concern for which social indicators were developed follows recommendations of the Commission on National Goals (1960): individual status, individual equality, state and local government, education, economic growth, technological change, agriculture, living conditions, and health and welfare. Problems of weighting the statistics are discussed together with evaluation of the data. Education and equality of racial opportunity are analyzed at length with numerous tables showing relevant statistics. References are included. (BL)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

PREPRINT

ED052028

QUALITY OF LIFE IN THE UNITED STATES—

An Excursion Into the New Frontier of Socio-Economic Indicators

by John Oliver Wilson

MRI 1041

SE 011 346

MIDWEST RESEARCH INSTITUTE 425 VOLKER BOULEVARD, KANSAS CITY, MISSOURI 64110 • AREA 816 561-0202

ED052028

QUALITY OF LIFE IN THE UNITED STATES—

An Excursion Into the New Frontier of Socio-Economic Indicators

by John Oliver Wilson*

*This report represents an updated version of an earlier study that was published in *Missouri State Tax Study* (Kansas City, Missouri: Midwest Research Institute, 1968), which the author had the privilege of directing. The author is currently an Assistant Professor of Economics at Yale University where he specializes in urban economics and public finance.

Many individuals have been instrumental in their contributions to this study, and it would be impossible to express my appreciation to all of them by name. The correspondence that I have received concerning the initial version has been of substantial assistance in addition to the critiques provided by the Graduate-Faculty Seminar on Micro-Economic Theory at Yale University and the Conference on the Measurement of Public Policies in the American States, held at the University of Michigan, August, 1968, where the concepts presented in this paper were discussed in detail.

I would particularly like to thank my research assistant, Miss Linda Crosswhite, Midwest Research Institute, for her invaluable service in collecting the basic data.

QUALITY OF LIFE IN THE UNITED STATES--
AN EXCURSION INTO THE NEW FRONTIER OF SOCIO-ECONOMIC INDICATORS

by John Oliver Wilson

I. INTRODUCTION

Since the acceptance of Keynesian economics and the subsequent development of a system of national income and product accounts, the economic measures of gross national product and personal income have rapidly assumed the trappings of sacrosanctity. As one economist has stated, "While there are other individual and social objectives, at least as important as making money, money income provides the principal measure of performance of the urban economy."[1/] Whether our consideration is the urban, state or national economy, per capita income has been readily accepted as an appropriate measure of economic and social progress.

There are, however, increasing signs of discontent with the continued use of these traditional measures of economic progress not only as measures of economic progress, but also as measures of political and social progress. Raymond Bauer has succinctly summarized this discontent in his statement: "For many of the important topics on which social critics blithely pass judgment, and on which policies are made, there are no yardsticks by which to know if things are getting better or worse."[2/] Yet changes in our current attitudes are increasingly evident. The crisis in our cities has demonstrated, if nothing else, the urgent need to broaden our concern to include all aspects of the quality of life in our urban centers. The Federal Space Agency recognized several years ago the need to assess more precisely the conditions in our total society. The first

---

1/ Wilbur R. Thompson, A Preface to Urban Economics (Baltimore: Johns Hopkins Press, 1965), p. 61.

2/ Raymond A. Bauer, ed., Social Indicators (Cambridge: The M.I.T. Press, 1966), p. 20.

Social Report of the President is now being prepared, and there is increasing discussion of the need to establish a President's Council of Social Advisors akin to the present Council of Economic Advisors.3/

Economists have long been aware of the many limitations of our current economic yardsticks. The problems of imputation, price indexes, and valuation of government output are well documented. And, when the economic measures are used for purposes other than evaluation of strictly economic conditions, the limitations become not only structural but also conceptual. The national income and product accounts were not conceptually designed to measure changes in our total socio-economic environment. Yet their misappropriation to this use has been an error more of omission rather than of commission. For lack of anything better, social scientists, politicians, and the general public have resorted to the use of those quantitative measures currently available; measures that are either ad hoc or were designed for other purposes.

Ad hoc comparisons, using only a select number of social and economic indicators, make little effort to justify either the selection or weighting of the given indicators. Other comparisons are based on such readily available economic indicators as income produced and personal income, or on measures of tax effort and fiscal capacity. But even these latter attempts are subject to a number of defects when making general comparisons among different regions in the nation.

3/ The federal government and the academic community are increasingly expressing their concern over the lack of sufficient measures with which to assess our socio-economic environment. Several years ago, NASA became a pioneer among government agencies in acting upon its concern with the impact of space exploration on society in general. The result of this concern was a volume edited by Raymond A. Bauer, Social Indicators, op. cit., which has received widespread consideration by the national leaders in the United States, France, India, Canada, and England. This volume, plus two issues of the Annals of the American Academy of Political and Social Science, published in 1967, represent the major published contributions in this relatively new area. The U.S. government has taken more than passive interest in developing social accounts, and in July of 1967, the Office of Assistant Secretary of Social Indicators, Department of Health, Education, and Welfare, was established with the purpose of preparing the first Social Report of the President.

First, such indicators tend to overemphasize the quantifiable characteristics of the regions relative to those characteristics--largely social and political--that are nonquantifiable. There is no measure, for example, of the importance of the effects of equal economic, political, and social opportunities on the general level of social well-being. Enforced open-housing statutes and racially balanced schools do not require large economic expenditures, yet their importance for minority groups in the large urban areas is readily apparent. Quite clearly, the importance of many of the facets of our environment cannot be represented by data on income or expenditure levels alone.

Second, the fiscal indicators fail to consider interstate differences in the provision of goods and services between the private and public sectors of our economy. The particular sector providing pure private or pure public services may not differ to any great extent among regions, but an increasing quantity of the services produced for eventual consumption either contain both public and private elements or may be provided by the private sector subject to governmental regulation. Education and highways, two of the largest state and local government expenditure areas, are outstanding examples where the public and private sectors of the different states may share in providing for these areas to widely differing degrees. Utilities and mass transportation are examples of areas where the government can actually provide the service or can regulate its provision by a private corporation.

Third, most fiscal indicators do not consider differences among the states in requirements for certain services. Yet, such states as New Jersey and Rhode Island are almost completely urbanized, while others, like the Dakotas, are still predominantly rural. To use expenditure levels in comparing the adequacy of public service in New Jersey to that in North Dakota is quite inappropriate. The urban areas require a much larger and very different package of services than do the rural areas. The newer states are not yet faced with the urban renewal problems existing in older states, while variations in the availability of natural resources, such as water supply and natural recreational facilities, create significant differences in requirements.

For these reasons--the increasing dissatisfaction with the limitations of the traditional economic indicators and our awareness of the need to assess the impact of social and political phenomena on our total society--it is imperative that the new frontier of social indicators be explored.

II. THE CONCEPT OF SOCIAL INDICATORS

With the existing sources of data it is possible to construct a limited number of social indicators to provide a much broader measure of state differences in living conditions than is now available. First, however, we must define what is meant by a social indicator. Throughout this analysis, we will adopt the following definition:

> A social indicator is probably most usefully defined as an aggregate or representative welfare measure; that is, as a statistic that measures the extent to which some goal of general interest has been achieved (rather than the government expenditures or inputs used to achieve that goal). The indicator can be obtained by aggregating other statistics into a meaningful summary statistic or by selecting from some properly defined set of statistics one series whose movements are reasonably representative of the rest.4/

The development of a set of social indicators with which to assess interregional differences in the quality of life in the United States requires the following steps: (1) selection of the geographical unit of analysis; (2) specification of the general areas of social concern for which indicators are to be developed; (3) collection of a relevant set of basic statistics from which a summary statistic can be created; and (4) aggregation of the basic statistics to obtain a limited number of meaningful social indicators. The first three steps will be discussed below, while the "weighting" problem inherent in the final step will be discussed in the following section.

In this study, states were chosen as the basic unit of analysis. There were several reasons for this selection. All of the literature to date has been addressed to the question of creating a set of social indicators at the national level. While this is certainly an appropriate level for the initiation of such an undertaking, we must also consider

---

4/ Mancur Olson, Jr., "An Agenda for the Development of Measures of the Progress of a Racial or Ethnic Group," U.S. Department of Health, Education, and Welfare (February 6, 1968), unpublished paper, p. 1.

what problems may be unique in extending our concepts to sub-national levels. In particular, consideration should be given to the unique problems that may be encountered as we attempt to develop social indicators for state and city decision-making units. In addition, the public sector of our economy must receive considerable attention in any relevant social indicator. And, because state and local governments have somewhat autonomous and clearly more dominant roles than the federal government has in providing those public services that have a direct and immediate impact on the quality of life provided the American citizen, it becomes imperative that the concept of social indicators be developed concurrently at all levels of government. At the state and local levels there may be far less certainty about the attributes of any social indicators. Governors and state legislatures may likely be less than enthusiastic in their acceptance of any quantification of an area previously so elusive as, for example, that of the extent of racial inequality existing within the state. Such political reluctance must be recognized early in this attempt to create a new social accounting system. Finally, states were chosen as the basic unit of analysis because the data necessary for the construction of social indicators are most readily available at the state level.

The use of states as the basic unit for comparison, which is dictated by the availability of sufficient relevant data, raises some rather significant problems. First, an implicit homogeneity assumption is made concerning the quality of life throughout the state. Clearly, within any state, social and economic conditions will vary considerably between urban and rural areas, between the central city and the suburbs, and even from neighborhood to neighborhood within the central city. Such variations cannot, unfortunately, be taken into consideration until data become more readily available, and the techniques of developing social indicators are more fully developed. Second, given the open economy of the states and the rapid mobility of our population, specific assumptions must be made about to exactly whom the social attributes available within a state will accrue. This problem becomes quite crucial in assessing, for example, state differences in the quality of their educational systems: Do the services provided by Yale University and the University of Michigan accrue to residents of the states in which these schools are located, or is the population that is served by these schools distributed throughout the nation?

In selecting the relevant areas for which social indicators should appropriately be developed, the researcher is faced with an endless task. The list of our current areas of social concern is almost unlimited.

So for simplicity of choice, nine of the eleven domestic goal areas included in the Report of the President's Commission on National Goals[5/] published in 1960 were selected for this present study.

The Commission on National Goals was a nonpartisan group appointed by President Eisenhower to suggest a set of goals for vital areas of our national life. The 11 members of the Commission, supported by private funds and having no direct connection with the federal government, used the contributions of over 100 leading authorities and specialists in defining the final goals. The objective of the goals report was to stimulate a continuing discussion and debate among Americans concerned with the quality of life in the nation; adoption of these recommended goals for use in this study is in keeping with this objective. We do not intend to suggest that these goals represent the ultimate set of normative variables with which to assess the existing quality of life, but they do represent the latest consensus of any type on a definitive set of goals for the nation as a whole.

The nine areas for which social indicators were developed are:

* Individual status: Enhancing personal dignity, promoting maximum development of capabilities, and widening the opportunities of individual choice.

* Individual equality: Eliminating discrimination on the basis of race.

* State and local government: Developing an informed and involved citizenry, improving the quality of public administration, increasing collaboration and the sharing of power among all levels of government, and improving the professionalism of state legislatures.

* Education: Improving the quantity and quality of education.

* Economic growth: Increasing both the quantity and quality of growth, including capital investment in the public sector, improving the standard of living, and providing education for a more capable and flexible work force.

5/ Report of the President's Commission on National Goals, Goals for Americans (Englewood Cliffs, New Jersey: Prentice-Hall, 1960).

* Technological change: Increasing the effort in research and the availability of manpower and facilities to maintain economic growth and improve living conditions.

* Agriculture: Improving the quality of life in the agricultural sector of our economy.

* Living conditions: Alleviating general poverty and the decayed conditions of the cities.

* Health and welfare: Improving the levels of welfare assistance, vocational rehabilitation, and provision of medical services in both the public and private sectors of the economy.

With the selection of the general areas for which social indicators are to be developed, it is then necessary to collect the relevant sets of basic statistics from which a summary statistic can be created. This task proved to be the most difficult phase of the study, since data on the social and political conditions in our society are much less developed and available than data pertaining to the economic conditions. A total of 85 different measures were used in constructing the final nine indicators. These measures and their sources are listed in the Appendix. The selection of these individual measures must be carefully considered since the quality of the summary indicator is quite clearly dependent upon the reliability and relevancy of the initial measures from which it was constructed. Every effort was made to relate the measures as closely as possible to the interpretation given each of the nine general areas as discussed in the President's Commission Report and related papers.

Measures of output were carefully distinguished from those of inputs to avoid duplication of what is essentially identical information, assuming a relevant relationship can be defined between the two. Such a dichotomization is complicated by an inability to specify clearly the output of certain areas. In the area of education, for example, the distinction between outputs and inputs is quite apparent and presents few problems. The quantity and quality of the educational service can be assessed by the level of achievement on tests and years of schooling.

The inputs to achieve this output include the availability of educational facilities and the socio-economic environment in which the educational process occurs.6/

In other areas, such as health and welfare, the distinction between inputs and outputs is far less clear. The output could appropriately be measured by the age-race adjusted mortality rates for each state, and inputs could be assessed by the number of physicians and hospital beds that are available to the residents of a given state. Such a formulation implies the existence of a given technical relationship or, in terms of the economist, a production function, for the health sector of the economy. Unfortunately, the research in this area is far less developed than in the previous example of education. And for certain other areas, such as racial equality and individual status, it is questionable whether such a technical relationship is even feasible. In these cases, individual measures were carefully selected to reflect the general intent of the area for which an overall indicator is being developed.

The nature of the basic measures used in constructing the nine social indicators can best be understood by simply listing a few of the actual measures. The indicator for "state and local governments" is based on 14 individual measures, including median annual salary of state and local government employees, percent of full-time employees covered with contributory life insurance, retirement and health and hospital coverage, state constitutional and statutory restrictions on local taxing powers and local government debt, quality of legislative services score, compensation of legislatures, and length of sessions.

6/ The most recent, and certainly the most exhaustive, study of the factors which influence educational achievement is: James S. Coleman and others, Equality of Educational Opportunity (Washington, U.S. Department of Health, Education, and Welfare, Office of Education, 1966). This study of racial differences in educational opportunity, which was based on a survey sample of more than 645,000 pupils located in 4,000 public primary and secondary schools, has generated a substantial amount of new discussion and research. While its conclusions are far from readily accepted, it has served a momentous service by at least challenging the conventional wisdom that school and teacher characteristics are the most important determinants of educational achievement. For a critique of the sampling and statistical techniques used in this study and, consequently, the findings of the study, see: Samuel Bowles and Henry M. Levin, "The Determinants of Scholastic Achievement--An Appraisal of Some Recent Evidence," The Journal of Human Resources, 3 (Winter 1968), pp. 3-24.

The entire analysis is highly interrelated, reflecting the actual conditions existing in our socio-economic environment. Some of the measures and indicators themselves are used to develop other indicators of the study. Individual status, for example, is measured by equality of individual opportunity, itself a separate indicator; an index of the quality of medical services, living conditions, and education; and the level of welfare and social security payments. All of the factors promote the maximum development of individual opportunities and contribute to the enhancement of personal dignity. Education and technological change are important factors influencing the rate and quality of economic growth. Such interrelationships cannot, and should not, be avoided if the model is to have any correspondence to the real world.

III. THE WEIGHTING PROBLEM

With the assistance of a socio-economic model, it is possible to collect a properly defined set of initial statistics. But the quite formidable problem of weighting each of these statistics remains to be resolved. For example, how much weight should be given to equality of educational attainment versus quality of urban housing in the overall socio-economic indicator for racial equality?

Factor analysis provides one mathematical approach to resolution of the weighting problem.7/ It is the object of factor analysis to represent a constructed, nonobservable social indicator, I, in terms of several underlying factors of hypothetical constructs. A linear model is employed in the analysis which makes a distinction between two approaches: (1) to extract the maximum variance from the original set of statistics, and (2) to "best" reproduce the observed correlations in the original set of statistics.

7/ The following discussion of the mathematical aspects of factor analysis represents a paraphrasing of the presentation contained in: Harry J. Harman, Modern Factor Analysis, 2nd ed., rev., (Chicago: The University of Chicago Press, 1967). Any similarity between the discussion and that in Harman is intentional so that we have to be concerned only with presenting the generalized concept of factor analysis. For an explicit discussion of the mathematical techniques used in the present analysis, the reader is referred to Harman, op. cit., Chapters 2, 5, 6, 8, and 16.

The mathematical procedure for extracting the maximum variance is formally called "component analysis" where each of n observed variables is described linearly in terms of n new uncorrelated components $F_1, F_2, \ldots . F_n$:

$$z_j = a_{j1}F_1 + a_{j2}F_2 + \ldots . + a_{jn}F_n$$

where z_j is the standardized form of the observed variable x_j.

Each component, in turn, makes a maximum contribution to the sum of the variances of the n variables. In a practical problem, component analysis provides an efficient summarization of the data since a few of the components will generally account for a large amount of the total variance. Once the factor loadings or weights for each variable are determined, it is possible to aggregate the standardized initial statistics into a set of indicators. These aggregated indicators are the "factor scores" associated with each component. The factor score for component, F_p, is given by:

$$I_p = \sum_{j=1}^{n} \frac{a_{jp}}{\lambda p} z_j$$

where λ_p is the eigenvalue.8/

A set of factor scores, m, will, in practical problems, reduce the initial set of statistics to some set of aggregated indicators $m < n$ which will account for the major portion of the variance in the original set of data.

8/ The eigenvalue has several important properties in factor analysis. Let V_p represent the value of the variance which the model seeks to maximize:

Then $\lambda_p = V_p = \sum_{j=1}^{n} a_{j1}^2$.

In other words, the eigenvalue is equal to the maximum amount of variance accounted for by factor F_p and, in addition, equals the sum of the squared factor weights.

The second model, called the "factor analysis" model, seeks to "best" reproduce the observed correlations in the original set of statistics. The mathematical form of the factor analysis model is:

$$z_j = b_{j1}F_1 + b_{j2}F_2 + \ldots + b_{jm}F_m + c_jU_j \qquad (j = 1,2,\ldots,n)$$

Each of the n observed variables is described linearly in terms of m (usually much smaller than n) common factors and a unique factor. The common factors account for the correlations among the variables while the unique factor accounts for the remaining variance (including error) of that variable. The factor scores for the factor analysis model cannot be exactly determined as for the component analysis model and must be estimated using conventional regression methods.9/

Both the component and factor analysis models start with the observed correlation matrix, R , of the initial data. The set of n variables is then analyzed in terms of common factors by inserting unities in the diagonal of R or in terms of common and unique factors by inserting communalities in the diagonal of R . Since there is no a priori knowledge of the values of the communalities, they must be estimated in the factor analysis model. (Note that they are implicitly assumed to equal unity in the component model.) The advantage of the factor model is that it enables more information to be included in the analysis, assuming that the estimates of the communalities existing among the original data are valid.

Both the component and factor analysis models were used in constructing the state rankings for the nine social indicators. As there was very little difference in the final rankings between these two models, the results from the factor model are given in this paper, since this model embodies more information concerning the initial set of measures. The factor scores for the first factor for each indicator were used in ranking the states, and in no case did the first factor account for less than 50 percent of the total variance in the initial set of data.

9/ The factor scores for the component model can be determined exactly and are unique since the model involves n common components, giving a nonsingular matrix. But the factor model involves both common and unique factors with the total number of factors exceeding the number of variables. An inverse does not exist for such a singular matrix so the accepted procedure is to estimate the factor scores by regressing factor F_p on the n variables. The factor score can be estimated from the correlations of the variables with the factor and the correlations among the variables.

The last two sections of this paper will present the modeling techniques used in two of the nine areas--equality of racial opportunity and education. It is hoped that these two examples will help clarify the general mathematical discussion presented above and assist the nonmathematical readers in assessing the techniques that were used throughout this analysis.

IV. STATE RANKINGS FOR THE NINE SOCIAL INDICATORS

The results of the state rankings, shown in Table 1, indicate that California leads the nation in the areas of individual status, education, and technological change. Living conditions are highest in Connecticut, while Hawaii provides the least segregated society. The highest ranking states in the nine areas for which social indicators have been developed are generally located in the North and Far West. The northeastern states of Connecticut, Massachusetts, and New York fare quite well. In the Midwest, Michigan, Minnesota, and Wisconsin all rank high for the majority of the nine areas. And on the West Coast, California ranks substantially above the surrounding states. The Southern States, primarily in the South-Central and South-Atlantic regions of the nation, dominate the lowest rankings. Alabama, Arkansas, Mississippi, and South Carolina invariably rank near the bottom for most of the areas. There are, however, some significant individual exceptions within these extreme states. For instance, Michigan fares rather poorly in welfare, and Alabama ranks relatively high in technological change.

These rankings represent a static analysis which attempts to assess state differences in certain socio-economic areas at one point in time. But the economic, social, and political conditions existing in any state are undergoing continuous, dynamic change. From a policy standpoint, a more relevant issue would concern the nature, direction, and rate of change in the quality of life within the various states or regions in the nation. Such a dynamic analysis, unfortunately, cannot be made with the current lack of historical data, particularly in the areas of racial equality and health and welfare.

It is readily obvious that the development of a set of social indicators is only the initial task. The causal relationship existing between any indicator and specific public or private policy programs in our society is a much more difficult problem to be resolved. As we have learned from our experience in developing a quantitative measure of gross national product where the causal relationship between fiscal and monetary policy and

TABLE 1

QUALITY OF LIFE IN THE UNITED STATES--INDIVIDUAL STATE RANKINGS FOR THE NINE SOCIAL INDICATORS, 1960-1966

	Individual Status	Racial Equality*	State and Local Government	Education	Economic Growth Quality	Technological Change	Agriculture	Living Condition	Health and Welfare
Alabama	47	34	34	49	38	21	48	47	44.5
Alaska	32	19	20	37	47	49	35.5	26	25
Arizona	30	23	21	5.5	27	28	1	31	38
Arkansas	46	37.5	48	44	42	35	49	41	36
California	1	3	4	1	3	1	2	3	14
Colorado	13	2	17	18.5	16.5	19	8.5	24	6
Connecticut	4	11	3	4	7	14	8.5	1	9
Delaware	27	28	16	21	4	29	12 5	8	3
Florida	29	35.5	18	36	15	7	34	37	42
Georgia	48	35.5	40.5	46	22	24	41	45	39
Hawaii	22	1	2	35	13	40	15	7	27
Idaho	24	-	36	9	25	43	12.5	18	44.5
Illinois	5	15	8	8	5	10	7	14	21
Indiana	23	12.5	27	13.5	12	17	17.5	34	37
Iowa	15	6	31	23	10	26	4	29	13
Kansas	20	15	29	12	30	31	17.5	38.5	34
Kentucky	40	26	50	40	24	30	45	27	46
Louisiana	41	32	38	41	41	25	40	49	31
Maine	36	-	23	45	49	50	37	15	23
Maryland	26	25	13.5	18.5	2	15	21.5	21	5
Massachusetts	3	7	1	2	18	4	27.5	9	12
Michigan	10	10	12	16	1	8	31	13	41
Minnesota	3	4	7	17	6	11.5	21.5	10	1
Mississippi	50	39	45	47	35	38	50	46	48
Missouri	38	20	35	28	39	20	38	36	28
Montana	19	-	37	25	46	47	5.5	23	19
Nebraska	31	21.5	33	10	23	39	10.5	40	29
Nevada	18	-	26	31	26	44	8	5	35
New Hampshire	16	-	32	33	33.5	42	32	19	22
New Jersey	6	18	6	5.5	19	9	10.5	4	24
New Mexico	39	24	43	32	48	36	35.5	32	43
New York	2	12.5	5	3	16 5	2	19	2	2
North Carolina	45	33	28	48	32	18	43.5	44	33
North Dakota	28	-	40.5	27	20	41	21.5	33	8
Ohio	14	17	15	29	29	6	25	17	30
Oklahoma	34	27	42	20	45	23	39	43	17
Oregon	12	8	11	13.5	8	32	16	11	11
Pennsylvania	17	15	9.5	24	40	5	29.5	16	16
Rhode Island	7	-	13.5	11	31	37	25	6	4
South Carolina	49	40	30	50	37	33	43.5	48	50
South Dakota	37	37.5	47	26	44	48	21.5	35	18
Tennessee	44	30	44	42	21	22	46	38.5	37
Texas	43	29	25	34	33.5	3	33	50	49
Utah	21	1	22	7	28	27	25	20	40
Vermont	33	-	24	38	36	45	29.5	25	10
Virginia	42	31	39	39	9	16	42	42	26
Washington	11	5	19	15	14	13	14	12	20
West Virginia	35	21.5	49	43	50	34	47	30	15
Wisconsin	8	9	9.5	30	11	11.5	27.5	22	7
Wyoming	25	-	46	22	43	46	5.5	28	32

* Data available for only 40 states.

the level of gross national product is a far from resolved issue, this task could well be quite formidable long after social accounts become commonplace. But the task will be exceedingly more difficult in the area of social indicators. The social indicators represent aggregations of basic statistics which are obtained from the application of certain mathematical techniques. There is no underlying theory of causal relationships nor is there the existence of a generally accepted weighting system. The Keynesian model and market-determined prices provide both of these important ingredients in the construction and causality analysis of our current economic indicators. To simply apply the statistical techniques of multiple-regression analysis, for example, to a derived social indicator as the dependent variable, seriously impairs any causality implications that may be made. Various socio-economic explanatory variables will be significant in their causality impact upon the individual measures that are included in the aggregate statistics, but the impact upon the aggregate statistic itself is far from obvious due to the nature of its construction.

V. EQUALITY OF RACIAL OPPORTUNITY

The meaning of equality of opportunity is hardly self-evident. To some readers, particularly the white middle-class suburbanite one or two generations removed from Eastern Europe, equality implies the opportunity of long hours of hard work, diligent saving, temporary domicile in the large city ghetto, and education for the young. This was the formula for success when he started at the bottom of the economic ladder, and what was good enough for him, or more likely his father, is good enough for the newcomer. To the concerned white liberal who espouses the virtues of equality and justice, racial equality may connote the opportunity for anyone to purchase a home where he pleases, given his economic capacity and equal access to employment and education, so long as he abides by the existing laws. But the young black from the city ghetto may take a far different view. Equality of opportunity may mean a $130 a week job, irrespective of whether he is educationally or emotionally qualified; it may mean greater than proportionate expenditures on schools, recreation facilities, and health and welfare than is spent in the white suburbs. Whether or not this long overdue balance in the economic system occurs within the existing legal system is irrelevant. The white man's concept of justice is itself discriminatory and would have to be altered in the process.

The definition of equal racial opportunity adopted throughout this paper will be more akin to that of the concerned white liberal, not so much reflecting the value system of the author as reflecting the nature of the data which are available for such an analysis. Consequently, the analysis

may reflect a more middle-of-the-road position. To the extent that racial discrimination cannot be corrected without an initial imbalance of expenditures and initiation of opportunities, this study will be somewhat conservative.

The model adopted in the study contains three major elements: (1) current economic status, (2) current economic discrimination, and (3) socio-economic impairment discrimination.

The logical point of departure for constructing a model is with the best aggregate socio-economic indicator that is now available--personal income. Racial differences in personal income, adjusted to account for structural differences among the states, can be readily obtained. But even such adjusted income data are inappropriate for our present consideration. Interstate differences in nonwhite personal income will reflect two levels of current economic status of the nonwhite relative to the white. The nonwhite may be at a relative economic disadvantage to the white within the state, and both the nonwhite and white may be at a relative disadvantage to residents of a more affluent state. A Negro living in Arkansas, for example, will have an income significantly less than that of a white person who also is a resident of Arkansas. But in addition, the Negro may be doubly cursed since he lives in a state that has a rather poor economy where the average income for all races is well below the average income level in the nation.

This situation points out the necessity of carefully defining the objective of the study. Our objective is to develop a social indicator of the degree of racial inequality existing within a given state. Our concern is that given a certain economic level within a specific state, we must then determine how equitably that economic level is made available to all the residents within the state.

The current economic status of the nonwhite within a state is hardly a sufficient aggregate indicator of racial inequality of opportunity. A Negro may receive less income, not because of discrimination, but simply because he works in a lower paid occupation or he has less education and the value of his marginal product is low. In the second element of the model, current economic discrimination, differences in income levels between the whites and nonwhites are compared after adjusting for occupational and educational differences. Given that a white and nonwhite are employed in the same occupation or have the same amount of education, what are the differences in their income levels? We still do not have a sufficient indicator. Current educational levels and occupational attainments are the accumulated result of investment in human capital. Or, as our model assumes, socio-economic impairment discrimination is a necessary

element in the aggregate indicator. Discrimination in the investment in such areas as education, health, and living conditions reduces the future level of productivity of human capital.

The major elements of the model are now complete, not that we have satisfied any necessary and sufficiency criteria, for there are many other vital areas of consideration. But we have exhausted the limit of our available data and we have provided a beginning, admittedly quite embryonic, for future development. Our model appears as follows in its mathematical form:

$$I_{RD} = a_1 X_1 + b_2 X_2 + c_3 X_3$$

$$= a_1 \sum_1 a_{1i} x_{1i} + b_2 \sum_j b_{2j} x_{2j} + c_3 \left(c_4 \sum_k d_k x_{3k} + c_5 \sum_m x_{4m} + c_6 \sum_n x_{5n} \right)$$

where $X_1 = \sum_1 a_{1i} x_{1i}$

$$X_2 = \sum_j b_{2j} x_{2j}$$

$$X_3 = c_4 \sum_k d_k x_{3k} + c_5 \sum_m x_{4m} + c_6 \sum_n x_{5n}$$

I_{RD}: Socio-Economic Indicator for Inequality of Racial Opportunity

X_1: Current Economic Status

x_{11}: ratio of nonwhite to white per capita median income adjusted for urban-rural differences in population distribution.

x_{12}: ratio of nonwhite to white employment rates.

X_2: Current Economic Discrimination

x_{21}: ratio of nonwhite to white income adjusted for occupation differences.

x_{22}: ratio of nonwhite to white income adjusted for educational differences.

X_3: Socio-Economic Impairment Discrimination

$\sum_k d_k x_{3k}$: education.

x_{31}: educational attainment as measured by the ratio of the white to nonwhite high school drop-out rate.

x_{32}: educational attainment as measured by the ratio of nonwhite to white college graduate rate.

x_{33}: educational quality as measured by the ratio of white to nonwhite percent of draftees who failed the mental requirements portion of their pre-induction examination.

$\sum_m x_{4m}$: health.

x_{41}: ratio of white to nonwhite age adjusted mortality rates.

$\sum_n x_{5n}$: environmental conditions.

x_{51}: urban housing density as measured by the ratio of white to nonwhite percent of occupied units with 1.01 or more persons per room.

x_{52}: quality of urban housing as measured by the ratio of nonwhite to white percent of occupied urban housing units which are sound and have all plumbing facilities.

x_{53}: segregation of urban housing as measured by a weighted index of the extent of segregation by census block.

In assembling the basic data, three primary considerations were found to be essential:

First, the data had to be "standardized" to exclude extraneous elements that would bias the results. Where necessary, all data were adjusted for urban-rural and sex and age structure differences among the states. In the areas of current economic status and current economic discrimination, the data had to be adjusted for sex because of the quite different occupational structures existing for males and females. A sample analysis of the data indicated that the same trend occurred whether such data included a weighted value of data for males and females or only the data for males.[10] Information for males was, in general, included in the final study as the expense of assembling the data was quite significant.

Second, a clear distinction should be made between inputs and outputs. Akin to the economic indicator of the value of all our goods and services--gross national product--a socio-economic indicator must carefully distinguish between data reflecting the final output of a social system and the inputs that went into that system. While this distinction may seem obvious, it is quite frequently overlooked in the current practice of presenting an ad hoc collection of socio-economic data.

Third, data were collected to reflect both the quantity and quality aspects of the specific area being measured. Measures of quantity are much more readily available than those of quality, creating a quite natural tendency to bias the resulting indicator in favor of quantity. Cognizance must be taken of this inadvertent bias by diligently seeking measures of quality. While a few quality indicators are available in the areas of education and housing conditions, the measurement of the quality of our socio-economic environment is sorely in need of vitalization.

The data represent a wide range of consideration, from income levels to segregated housing. Quite naturally, information contained in some of the data will be similar to that contained in the other data. As indicated by the simple correlation coefficients shown in Table 2, there is a substantial amount of correlation between the specific measures. As

---

10/ A structured sample was taken of the data used in measuring current economic status and current economic discrimination by race for both sexes separately. The data were then weighted by the percent of the population within a state within each category and compared to the data for males only. There was not found to be any appreciable difference in the results.

TABLE 2

SIMPLE CORRELATION MATRIX OF BASIC DATA

	x_{11}	x_{12}	x_{21}	x_{22}	x_{31}	x_{32}	x_{33}	x_{41}	x_{51}	x_{52}	x_{53}
x_{11} (median income)	1.000	0.529	0.817	0.778	0.387	0.604	0.687	0.668	0.479	0.751	0.552
x_{12} (empl't rate)		1.000	0.188	0.066	0.425	0.336	0.304	0.307	0.061	0.447	0.154
x_{21} (income adj. for occupation)			1.000	0.931	0.295	0.662	0.640	0.513	0 542	0.706	0.476
x_{22} (income adj. for education)				1.000	0.088	0.535	0.554	0.525	0.557	0.623	0.517
x_{31} (high school drop-out rate)					1.000	0.769	0.681	0.066	0.174	0.257	0.303
x_{32} (college graduate rate)						1.000	0.618	0.294	0.383	0.420	0.353
x_{33} (pre-induction mental exam)							1.000	0.368	0.425	0.725	0.564
x_{41} (mortality rate)								1.000	0.531	0.466	0.348
x_{51} (urban housing density)									1.000	0.484	0.298
x_{52} (quality of urban housing)										1.000	0.463
x_{53} (segregated housing)											1.000

would be expected, income adjusted for occupation is highly correlated with income adjusted for education since education is a significant prerequisite for access to the majority of occupations. Conversely, the employment rate has a low correlation with segregated housing, the latter being more a social phenomenon. The high degree of correlation existing between some of the data and the wide range of the degree of correlation, ranging from a high of 93.1 percent to a low of 6.1 percent, raise the interesting problem of weighting in constructing the overall socio-economic indicator. As was discussed in Section III, factor analysis was used to develop a set of weights.

Since the weighting system is not unique, we developed three different social indicators of equality of racial opportunity.

Indicator I applies the component analysis model to the two major areas: Current Economic Status, X_1, and Current Economic Discrimination, X_2, individually. The same approach is then applied to the sub-areas of education, health, and environmental conditions within the major area of socio-economic Impairment Discrimination, X_3 . The three sub-areas are then weighted equally in obtaining the aggregate value for X_3 . Finally, all three major areas, X_1, X_2, and X_3, are weighted equally in obtaining the overall value of the racial discrimination indicator, I_{RD} . Indicator II applies the factor analysis model to all the initial data simultaneously using squared multiple correlation coefficients as estimates of existing communalities. Indicator III applies the component analysis model to all the initial data simultaneously.

These three indicators, each with different weights associated with the initial data, are similar in one basic aspect. They all depend upon the theoretical model defining inequality of racial opportunity to select the appropriate set of initial data. With Indicators II and III, this is the sole purpose of the model as the data are all treated as equal inputs in the factor and component analyses. But with Indicator I, the model assumes a much more dominant role. Not only does it serve to select the initial set of data, but it also implies information on the weighting of the data. The three major elements, X_1, X_2, and X_3, are assumed to contribute equally in determining the inequality of racial opportunity within a state, and education, health, and environmental conditions are all given equal weight in determining the degree of socio-economic impairment discrimination.

The weights used in constructing the three socio-economic indicators of inequality of racial opportunity are given in Table 3. These are the weights associated with the first factor in the mathematical solution. As we recall, the first factor makes the maximum contribution

TABLE 3

FACTOR WEIGHTS USED IN CONSTRUCTION OF SOCIO-ECONOMIC INDICATORS OF INEQUALITY OF RACIAL OPPORTUNITY

Elements of Model	Weights for Indicator I	Percent of Variance Accounted for by Weights of Indicator I	Weights for Indicator II	Weights for Indicator III
X_1	(1.0)[a/]	78.5	-	-
x_{11}	13.8783		0.9177	0.9225
x_{12}	8.6525		0.4204	0.4364
X_2	(1.0)	96.6	-	-
x_{21}	12.4030		0.8903	0.8851
x_{22}	11.5411		0.8251	0.8185
X_3	(1.0)		-	-
$\sum d_k x_{3k}$	(1.0)		-	-
x_{31}	7.3323	94.2	0.5321	0.5257
x_{32}	20.3961		0.7473	0.7451
x_{33}[b/]	14.4030	100.0	0.8345	0.8306
$\sum x_{4m}$	(1.0)		-	-
x_{41}	10.8204	100.0	0.6101	0.6402
$\sum x_{5n}$	(1.0)	72.1	-	-
x_{51}	7.3530		0.5861	0.6256
x_{52}	12.7255		0.8107	0.8129
x_{53}	3.6817		0.5886	0.6345
Percent of variance accounted for by weights		-	52.3%	53.5%

a/ The unitary values in parentheses indicate the equal weights associated with various sub-elements of the basic model in constructing Indicator I.

b/ In constructing Indicator I, educational quality, x_{33}, was given equal weight to educational quantity, x_{31} and x_{32}.

toward accounting for the total observed variance in the initial data. Thus, the weights used in constructing Indicator III accounted for 53.5 percent of the given variance. There is very little difference in the weights between Indicators II and III which applied factor and component analyses to the initial data, respectively. The weights used in constructing Indicator I cannot be compared with those for the other two due to the quite different treatment of the sub-elements of the basic model, as shown by the weights in parentheses. For each of the sub-areas, the first factor accounted for a substantially greater amount of the initial variance as would be expected with much smaller sets of initial data.

The sets of weights given in Table 3 were then applied to the standardized initial data to obtain the results for each state as presented in the following section.

The results from the three socio-economic indicators are shown in Table 4 where the states are ranked according to the value of their factor scores. The states indicating the greatest equality of opportunity are ranked highest where, according to our model, Hawaii is clearly the least segregated of the 40 states that have significant nonwhite populations. Colorado, California, Minnesota, and Washington vie for the other high positions with some variation in their ranking according to the particular indicator. The most segregated states are still in the Deep South despite the existence of large ghettos in the northern cities.

There is actually very little difference in the rankings of the states for each of the indicators. The Spearman rank order correlations show that the rankings vary in correlation from 94.4 percent between Indicators I and II to 96.0 percent between Indicators II and III.[12]

12/ Spearman rank order correlations, r_s, are determined by the following equation:

$$r_s = 1-(6_i\Sigma d_i^2)(1/n(n^2-1))$$

where d_i represents the difference in ordinal rank value for two series of data. The value for r_s will equal +1.0 whenever the rankings are in perfect agreement, 0 when no relationship whatsoever occurs, and -1.0 where there is perfect disagreement. The rank order coefficients for the three socio-economic indicators are:

Spearman Rank Order Correlations
(All significant at the one percent level)

	I	II
II	0.944	
III	0.951	0.960

TABLE 4

STATE RANKINGS FOR THE THREE SOCIAL INDICATORS OF INEQUALITY OF RACIAL OPPORTUNITY

State	I	II	III	Indicator III Expressed as a Percentage Measure
Hawaii	1	1	1	60.8
Colorado	2	5	5	57.3
California	3	3	3	58.3
Minnesota	4	2	2	60.7
Washington	5	4	4	57.3
Iowa	6	7	7	52.7
Massachusetts	7	9	8	51.4
Oregon	8	6	6	54.7
Wisconsin	9	8	9	49.4
Michigan	10	12	11	48.2
Connecticut	11	17	13	47.8
New York	12.5	10	12	48.0
Indiana	12.5	15	17	46.2
Kansas	15	20	19	45.0
Illinois	15	13	20	45.0
Pennsylvania	15	11	16	46.3
Ohio	17	14	14	47.2
New Jersey	18	22	18	45.4
Alaska	19	21	10	48.7
Missouri	20	18	22	43.6
Nebraska	21.5	19	21	43.7
West Virginia	21.5	16	15	47.0
Arizona	23	26	23	40.9
New Mexico	24	30	25	41.4
Maryland	25	27	29	40.2
Kentucky	26	23	24	42.4
Oklahoma	27	24	26	41.3
Delaware	28	29	28	40.3
Texas	29	31	30	39.3
Tennessee	30	28	31	37.7
Virginia	31	33	32	35.9
Louisiana	32	35	34	35.2
North Carolina	33	32	35	34.8
Alabama	34	34	37	33.1
Florida	35.5	38	36	33.2
Georgia	35.5	36	38	32.5
South Dakota	37.5	25	33	35.5
Arkansas	37.5	37	27	42.7
Mississippi	39	40	39	29.5
South Carolina	40	39	40	29.4

Since the correlation would be 100.0 if there was perfect agreement, it is quite evident that all three indicators give nearly identical results.

The rankings shown in the first three columns of Table 4 are, of course, ordinal and give no indication of whether or not Hawaii and California are approaching a fully integrated society. The only information contained in such an ordinal ranking is that a Negro, on the average, has a greater equality of opportunity in Massachusetts then he does in Kentucky, but whether that difference in opportunity is or is not significant is indeterminant. Just how much better off is the nonwhite in Hawaii than the nonwhite in South Carolina?

An answer to this question requires cardinal indicators, indicators that can distinguish the degree to which equality of opportunity in one state exceeds that in another. Such cardinal information is contained in the factor scores, but the scores themselves have little intuitive meaning. To enhance the interpretation of the factor scores, they have been transformed to a percentage scale. Factor scores were calculated for two hypothetical states which have perfect integration and perfect segregation. A perfectly integrated state would achieve a score of 100 percent while the converse would rate a score of 0 percent. A linear mapping of Indicator III was then performed onto this percentage range.13/ The results of this linear mapping are given in the fourth column of Table 4 where it is readily apparent that while Hawaii, Colorado, and California rank at the top, the nonwhites in these states have access to less than 60 percent of the equality of opportunity available to the white residents of the states. Even the "best" states in the nation are far from a perfectly integrated society; and in the South, the nonwhite exists in a substantially greater segregated society, enjoying less than 30 percent of opportunity made available to the white majority.

13/ The factor score for a perfectly integrated state was calculated by assuming that it achieved a value of 100.0 percent for all of the basic statistics. As we recall, all the basic data represent ratios of nonwhite to white or vice versa for the specific areas of measurement. Conversely, a perfectly segregated state would achieve a hypothetical value of 0.0 percent in all areas. The factor scores for Indicator III were 6.6523 and -5.1926, establishing the relevant percentage range. The actual factor scores were then mapped onto this percentage range according to the following equation:

$$Y_i \text{ (percentage value for state i)} = (X_i \text{ (factor score)} + 5.9926)(1/11.8449)$$

VI. EDUCATION

To undertake an assessment of the educational policy of state and local governments is to forthrightly invite controversy. As one who has endured more than his share of opposition in this area has stated, "Of all Western countries I know, only in the United States is there such suspicion, bordering on hostility, of the federal government on the part of some local and state school systems, not only in the South, but in the North and West as well."[14] This opposition encountered in the Coleman study is not unique to federally sponsored studies. In a program of national assessment of education being planned under the auspices of the Carnegie Corporation, the executive secretary of the American Association of School Administrators sent a memorandum to Association members, school superintendents, and principals throughout the nation urging them not to participate.[15] With the existence of such suspicion and hostility, it is imperative that we clearly specify the problems that must be resolved in the theoretical development of education social indicators. In order to minimize the likelihood of misunderstanding, we will explicitly define what we are attempting to measure and to state frankly our basic assumptions.

The theoretical concepts underlying the education indicators should minimally encompass four considerations. First, in assessing the quantity and quality of educational service, a clear distinction must be made between educational outputs or the final product and the inputs required to provide the service. Second, since the entities to be investigated are the state and local governments and private institutions that provide educational services, is it appropriate to hypothesize a relationship between the educational output of a state and the environmental-institutional conditions which exist in the state? Third, the theoretical model must take into consideration the interstate mobility of the population. Fourth, education is provided both publicly and privately, and the reliance upon each sector varies substantially among the states.

We assume that within a state there exists an environment that is conducive to the attainment of an education. This environment will include the nature of the socio-economic base, e.g., degree of urbanization, occupational characteristics of the labor force, level of income, as well as differences in school and teacher characteristics. The combination of all these characteristics will provide a distinguishable overall environment that directly influences the quantity and quality of education achieved by the citizens educated in the primary and secondary school systems within that state.

14/ James S. Coleman, "Equality of Educational Opportunity: Reply to Bowles and Levin," The Journal of Human Resources, 3 (Spring 1968), p. 237.

15/ Ibid.

Such an assumption would seem to be reasonable. Certainly the states differ in their basic demographic and economic characteristics. And while it may be argued that state boundaries are artificial demarcations that bear scant relationship to the actual nonpolitical environment, we can only follow the example of all similar sub-national studies and define our entities in the traditional manner. From a public policy point of view, states provide a most logical unit of investigation. Education is still predominantly a public service that is provided by state and local governments.[16]

The most difficult problem to overcome is that of population mobility. In assessing state differences in education, population mobility is encountered at two levels: first, the mobility of families with school-age children and second, the mobility of college students.[17] That the population in the U.S. is very mobile hardly needs substantiation. It is fairly common knowledge that one out of every five families changes their residence each year. Less well known is the fact that most of these moves are for a short distance. While in 1966-67, 19 percent of the total population moved, the majority, 11.6 percent, remained in the same county, and only 3.4 percent moved to another state. Of the total school-age population, only 3.1 percent crossed state lines.[18] It is apparent that with states serving as our entity of analysis, the interstate mobility of the total population is not a serious problem.

16/ The federal government cannot directly dictate education policy, as evidenced by their inability even to obtain information on existing conditions for purely research considerations. They do, however, indirectly influence budgetary decisions through a system of educational and research grants. The demarcation of the traditional role of the federal government vis-a-vis state and local governments in the area of public education is becoming exceedingly less apparent, a quite likely source of the apparent irritation and sometimes outright hostility that exist between the levels of government. Yet, the federal government actually performs a quite modest role in assisting the state and local governments with their educational burden, providing only 7.7 percent of the total revenue expended on education in the United States in 1961-62.

17/ Interstate student mobility is also encountered at the private secondary school level. Data on the relative size of this mobility, if available, could not be located.

18/ U.S. Department of Commerce, Bureau of the Census, "Mobility of the Population of the United States, March 1966 to March 1967," Series P-20, No. 171, April 30, 1968.

The mobility of college students is, however, of much greater significance. In the fall of 1963, 20 percent of all students enrolled in higher education were attending an out-of-state institution, a percent that has remained constant since at least 1930.[19] New Jersey and New York are notorious for their outmigration of college students at the expense of Massachusetts, Michigan, and California. The assumptions made regarding the out-of-state student will have a significant impact on the results of the analysis. The basic issue is whether the products of the University of Michigan or Yale can be attributed solely to the state within which that university happens to be located. In this study, we assume the contrary. The out-of-state student is included as a product of the environment in his home state. The out-of-state student is assumed to gain admittance and, to a large extent, prominence in such a university because of individual characteristics and the quality of the primary and secondary schools he attended in his home state.

Education is a service that is provided through both the public and private sectors of our economy. The particular sector where the service is provided is not held to be crucial, so long as all residents have access to legally minimum standards of education. Consequently, some states have relied almost exclusively upon the public sector to provide the service. In other states, due to historical precedents and the socio-economic and religious composition of their residents, a substantial quantity of their educational services are provided by the private sector. The differences among states in the allocation of educational responsibility between the private and public sectors are quite significant. In nine states, over 20 percent of all primary and secondary students are enrolled in private schools, while less than 5 percent are privately educated in 12 states.[20] With such a substantial difference among the states in their source of education, it was assumed that both private and public education should be analyzed simultaneously. This choice is quite consistent with the desire to develop a social indicator of the total educational output of a state.

19/ Mabel C. Rice and Paul L. Mason, "Residence and Migration of College Students, Fall, 1963, State and Regional Data," U.S. Department of Health, Education, and Welfare, Office of Education, 1965.

20/ The average percent of total primary and secondary school students enrolled in private institutions in the U.S. is 11.9 percent with a standard deviation of 7.2 percent.

The educational output indicator was developed from six measures,[21] beginning with a strictly quantitative measure of total primary and secondary school enrollment as a percent of the school-age population and continuing in a logical sequence until the student is enrolled in a graduate or professional program. The enrollment measure serves primarily as the bench mark from which to follow the progression of the student through the educational process.[22] Our concern is then for those who fail to complete high school--the student enrolled in the tenth grade, but who fails to graduate. Many of those who terminate their formal secondary education, either as graduates or dropouts, will enter the labor force and thus, are no longer relevant to our analysis. But others will enter the military, where we can assess the quality of their education as given by pre-induction mental examinations. For those who enter college, we assume that a measure of the quality, in addition to quantity, of their

---

21/ Fourteen measures of educational output were initially collected, from which the final set of measures was selected as the smallest set indicative of our basic assumptions of the educational system. Data were collected in depth to reduce the error of data instability and response error. For example, data on high school dropout rates were taken from U.S. Office of Education and National Education Association sources for several time periods. The Army pre-induction examination results were calculated as an average for the three-year period from 1964-66 by aggregating the explicit number of those examined and those who failed. This provided a check on the variability of yearly averages for the small states. Yearly averages were also included for the years 1960-66 individually, since demand for draftees and the supply of more highly educated eligible draftees significantly altered the mental qualification rate. As was anticipated, most of these measures were highly correlated with each other and could be appropriately eliminated without undue loss of information. The vocational measures were eliminated on the basis of a factor analysis, and the remaining set of academic-orientated measures was reduced by analyzing the correlations of the various sub-sets of data.

22/ The output data are for the time period 1964-66 so that we are not, in fact, measuring the progression of a specific student through the educational system of any particular state. Rather, we are dealing in general terms with the various levels of educational attainment of the citizens of a state at one period in time. The sequential concept is used for rhetorical purposes to facilitate an understanding of the logical, rather than ad hoc, selection of the initial measures of educational output.

education is the proportion of high school graduates who enroll in formal higher educational programs. Our quality and quantity assessment then extends on to graduate and professional schools where we use a measure of the percent of undergraduate students who enroll in such advanced degree programs.[23] The set of six output measures used in constructing the education indicator is:

x_1: High school dropout rate (difference between 10th grade enrollment in 1963-64 and number graduating in 1966).

x_2: Percent passing pre-induction mental examination, 1966.

x_3: Percent of population ages 5-20 enrolled in high school (average for period 1964-66).

x_4: First-time college enrollees, fall 1963, as a percent of high school graduates, spring 1963.

x_5: Percent of population ages 18-44 enrolled in higher education, fall 1963.

x_6: First-time professional and graduate students, fall 1963, as a percent of full-time undergraduates, fall 1963.

23/ Notably lacking from our measures of educational output is any consideration of vocational training. In our initial analysis, several measures of vocational training were included, yet factor analysis of all the measures clearly indicated that there is a strong dichotomization between academically orientated and vocationally orientated education. By including such vocational measures, we were only diffusing the information that existed in the initial data. This dichotomization was tentatively verified in multiple regression analysis of explanatory variables on the individual measures of educational output. Environmental conditions and school and teacher characteristics were found to be much more highly significant in explaining state differences in academically orientated education, while employment levels and occupational structure appeared more significant in explaining differences in vocational education output.

The final set of six output measures used in constructing the indicator was carefully selected to avoid duplication of information and was the smallest set that could be obtained while preserving our basic concept of the educational system. As shown by the correlation coefficients in Table 5, there is very little duplication of information in the six measures. The highest correlation between any two of the measures is 72.7 percent, while eight of the 15 correlation coefficients are less than 40 percent.

TABLE 5

PEARSONIAN CORRELATION COEFFICIENTS FOR SIX EDUCATIONAL OUTPUT MEASURES

	y_1 School Enrollment as Percent of 5-20 Age Group, Avg. for 1964-66	y_2 % of 10th Grade Enrollment in 1963-64 who Graduated in 1966	y_3 % Passing Army Mental Exam., 1964	y_4 First Time College Enrollees, Fall 1963, as % of H.S. Grads, Spring 1963	y_5 Professional and Graduate Students as % of Total Undergraduates, 1964	y_6 % of Population Enrolled in Higher Education, 1964
y_1	1.000	0.537	0.678	0.240	0.310	0.549
y_2		1.000	0.661	0.162	0.219	0.571
y_3			1.000	0.361	0.179	0.727
y_4				1.000	0.180	0.656
y_5					1.000	0.313
y_6						1.000

The indicator defined above will quite naturally tend to emphasize the higher quality educational service that is available in the more wealthy states. The outcome is to be expected. The states with the higher income levels and greater concentrations of property wealth are able to finance better schools, pay higher salaries, and expose students to travel, cultural events, and other environmental experiences vital to educational attainment. This fact of life should not cast dispersion on the output indicator. But it does suggest that a more comprehensive analysis would include some indication of relative differences in fiscal capacity and the effort being exerted by states to provide educational services. For this reason, a second indicator assessing state differences in educational needs and relative effort was constructed as the weighted sum of the following four individual measures.

z_1: Number of school-age children (5-17 years) per 1,000 adults (21-64 years) 1963-64.

z_2: Personal income per pupil in average daily attendance 1963-64.

z_3: Current expenditures for elementary and secondary schools as percent of personal income, 1963-64.

z_4: State and local expenditures for education as percent of total government expenditures, 1962.

The number of school-age children per 1,000 adults varied substantially from one state to another. New Mexico, with 66.2 percent of its population of school age, is confronted with a much greater demand for education than is New Jersey, where only 43.0 percent of the population is of school age. In addition, New Jersey has a much higher level of personal income per pupil in average daily attendance. These demand and supply conditions create a situation where, in general, the high demand, but low income state must allocate both a larger proportion of its personal income and a greater proportion of its total state and local budgets to support education. These trends are verified as shown by the correlation coefficients in Table 6. The demand for educational service has a high negative correlation with personal income; hence, the wealthy states not only have a greater capacity to support education, but have fewer children to educate per tax-paying adult. As a result, they can allocate a smaller proportion of their personal income and of their total public budgets to education and, at the same time, provide a higher quality of educational service. It is the purpose of the second indicator to point out this disparity between the wealthy and poor states.

TABLE 6

PEARSONIAN CORRELATION COEFFICIENTS FOR
FOUR EDUCATIONAL DEMAND AND SUPPLY MEASURES

	z_1 Number of School-Age Children (5-17 Yr.) per 1,000 Adults (21-64 Yr.) 1963-64	z_2 Personal Income per Pupil in Average Daily Attendance, 1963-64	z_3 Current Expenditures for Elementary and Secondary Schools as Percent of Personal Income, 1963-64	z_4 State and Local Expenditures for Education as Percent of Total Government Expenditures, 1961-62
z_1	1.000	-0.804	0.673	0.450
z_2		1.000	-0.521	-0.347
z_3			1.000	0.509
z_4				1.000

The two educational indicators are derived as a weighted sum of the individual measures taken as a percent of the U.S. average. The indicators are given by the following relationship:

$$I_i = (\sum_j c_j x_{ij})(1/\sum_j c_j \bar{x}_j)$$

where x_{ij} is the initial education statistic j for state i ; c_j is the factor loading or weight for the first factor; and $\bar{x}_j$ is the average value of the jth measure of education.

A factor analysis solution was derived and the weights for the first factor were used in weighting the individual measures of education output and relative needs and fiscal capacity in constructing the two education indicators. These weights are given in Table 7.

TABLE 7

FACTOR WEIGHTS USED IN CONSTRUCTION OF SOCIO-ECONOMIC INDICATORS OF EDUCATIONAL OUTPUT AND RELATIVE NEEDS AND FISCAL CAPACITY

Elements of Model	Weights Used in Constructing Indicator	Percent of Variance Accounted for by Factor Weights
Educational output		54.06
x_1	0.7819	
x_2	0.7540	
x_3	0.8731	
x_4	0.5731	
x_5	0.4210	
x_6	0.8922	
Relative needs and fiscal capacity		66.92
z_1	0.9148	
z_2	0.8310	
z_3	0.6712	
z_4	-0.8360	

The resulting two education indicators are shown in Table 8 where the value for each state is expressed as a percent of a U.S. average. Alabama, for example, provides an education product to its citizens that is only 74.6 percent of the quantity and quality available in the U.S. as an average. But given their existing resources, the residents of Alabama are certainly making a greater than average effort to support education as shown by the second indicator. Alabama not only faces a greater demand for educational services, but also has less capability to supply such a demand. The contrast is most glaring when we examine the conditions existing in California. California provides the highest level of educational service available in the nation, 28.6 percent above the national average, yet this is accomplished through the combined effect of very favorable environmental conditions and the wealth to support public policy decisions.

TABLE 8

STATE VALUES FOR THE TWO EDUCATION SOCIAL INDICATORS

	Educational Output	Relative Needs, Fiscal Capacity, and Budgetary Effort
	I	II
Alabama	74.6	110.5
Alaska	91.6	110.0
Arizona	114.8	111.8
Arkansas	83.8	107.1
California	128.6	93.2
Colorado	106.0	105.8
Connecticut	117.0	76.9
Delaware	105.0	88.5
Florida	93.1	93.8
Georgia	78.3	104.4
Hawaii	96.1	91.3
Idaho	109.8	109.1
Illinois	111.1	77.4
Indiana	108.1	101.7
Iowa	104.0	103.7
Kansas	108.5	102.3
Kentucky	88.6	100.3
Louisiana	88.1	109.3
Maine	82.5	100.4
Maryland	106.0	91.2
Massachusetts	119.3	77.0
Michigan	107.3	101.2
Minnesota	106.5	105.0
Mississippi	76.0	114.8
Missouri	101.5	87.9
Montana	103.1	108.4
Nebraska	109.7	96.5
Nevada	98.4	81.0
New Hampshire	97.8	85.5
New Jersey	114.8	78.7
New Mexico	98.3	125.8
New York	118.5	74.1
North Carolina	75.3	112.9
North Dakota	101.6	109.5
Ohio	101.3	94.3
Oklahoma	105.3	102.6
Oregon	108.1	105.7
Pennsylvania	103.6	88.5
Rhode Island	108.9	76.9
South Carolina	74.0	116.8
South Dakota	102.0	111.5
Tennessee	86.2	102.4
Texas	96.8	104.0
Utah	113.5	125.8
Vermont	90.0	101.7
Virginia	89.5	99.6
Washington	107.5	102.9
West Virginia	84.8	112.2
Wisconsin	100.4	93.9
Wyoming	104.4	112.9

APPENDIX

THE SPECIFIC INDICATORS FOR EACH GOAL AREA USED TO CALCULATE THE S-E-P INDEX

I. THE STATUS OF THE INDIVIDUAL

A. Enhance Individual Dignity

Level of Public Assistance for:[1] (average monthly payments)

Old-age assistance

Aid to familes with dependent children

Social Security payments for:[1] (average monthly payments

Retired

Disabled

Living conditions index[2]

B. Promote Maximum Development of Individual Capabilities

Quality of medical service index[3]

Education index[4]

C. Widen Opportunities for Individual Choice

Equality index[5]

II. INDIVIDUAL EQUALITY

Eliminate Discrimination on Basis of Race, Sex, and Religion

A. Current Economic Status

Ratio of nonwhite to white per capita median income adjusted for urban-rural differences in population distribution[6]

Ratio of nonwhite to white employment rates[6]

B. Current Economic Discrimination

Ratio of nonwhite to white income adjusted for occupation differences[6]

II. INDIVIDUAL EQUALITY (Concluded)

Ratio of nonwhite to white income adjusted for educational differences[6]

C. Socio-economic Impairment Discrimination

Educational attainment as measured by the ratio of of the white to nonwhite high school drop-out rate[6]

Educational attainment as measured by the ratio of nonwhite to white college graduate rate[6]

Educational quality as measured by the ratio of white to nonwhite percent of draftees who failed the mental requirements portion of their pre-induction exams.[7]

Health

Ratio of white to nonwhite age adjusted mortality rates[8]

Environmental Conditions

Urban housing density as measured by the ratio of white to nonwhite percent of occupied units with 1.01 or more persons per room[9]

Quality of urban housing as measured by the ratio of nonwhite to white percent of occupied housing units which are sound and have all plumbing facilities[9]

II. INDIVIDUAL EQUALITY (Concluded)

Segregation of urban housing as measured by a weighted index of the extent of segregation by census block[10]

III. STATE AND LOCAL GOVERNMENT

A. Informed Citizenry

Percent of total population of voting age who voted in 1964 presidential election.

Percent of total population subscribing to daily newspapers[11]

Education level--median years of school completed[12]

B. Professionalism of Public Administration[13]

Median annual salary of state-local government employees

Percent of full-time employees under state or local retirement system

Percent of full-time employees under contributory life insurance coverage

Percent of full-time employees under contributory health or hospital coverage

C. Professionalism of State Legislatures[42]

Biennial compensation of legislatures, 1964-65

Expenditures for legislative staff, services, operations, and printing, 1963-64

Number of bills introduced in 1963-64 sessions

Length of regular plus extra sessions, in calendar days, 1963-64

Legislative services score

D. Dispersion of Power: State-Local

Political jurisdiction

State constitutional and statutory restriction on local taxing power[14]

State constitutional and statutory restriction on local government debt[15]

IV. EDUCATION

A. Output

One minus the high school dropout rate[16]

Percent passing pre-induction Army mental examination[17]

Percent of population ages 5-20 enrolled in high school[18]

First-time college enrollees as a percent of high school graduates[19]

Percent of population ages 18-44 enrolled in higher education[20]

First-time professional and graduate students as a percent of full-time undergraduates[19]

V. ECONOMIC GROWTH

A. Output

Percentage increase in personal income, 1960-65[21]

Percentage increase in per capita personal income, 1960-65[21]

B. Input

Per capita capital outlay by state and local governments[22]

Unemployment rate[23]

Living conditions index[2]

Technological change index[24]

Education index[4]

VI. TECHNOLOGICAL CHANGE

A. Promotion and Encouragement of Technological Change

Patents issued to residents of each state[23]

Current expenditure on research in universities and colleges[26]

Industrial research and development expenditures[27]

Manpower[28]

Number of scientists[29]

NASA research contracts with universities and nonprofit organizations net subcontracts[30]

Military prime contracts for research[30]

AEC research contracts with universities and nonprofit organizations[28]

B. Education and Retraining

Enrollment in vocational and technical education as percent of population[31]

Per capita expenditure for vocational education[32]

VII. AGRICULTURE

A. Farm Level-of-Living Index[33]

Average value of land and buildings per farm

Average value of sales per farm

Percent of farms with telephones

Percent of farms with home freezers

Percent of farms with automobiles

VIII. LIVING CONDITIONS

A. Remedy Slum and Poverty Conditions

Total state technical assistance expenditure per poor person[34]

Economic opportunity assistance expenditure per poor person[34]

Percent of families with income under $3,000[35]

Percent of sound housing units with plumbing facilities[36]

B. Reverse the Process of Decay in Larger Cities

Per capita general expenditure of state and local governments for housing and urban renewal[37]

Weighted index of crime rates[38]

C. Relieve the Necessity for Low-Income and Minority Groups to Concentrate in Central Cities

Weighted index of median family income in central cities as a percent of SMSA median family income[39]

D. Expand Parks and Recreation as Necessary to Meet Demand

Per capita recreation area[40]

IX. HEALTH AND WELFARE[41]

A. Medical Care

Number of doctors per 100,000 population

IX. HEALTH AND WELFARE (Concluded)

Number of dentists per 100,000 population
Number of nurses per 100,000 population
Number of acceptable general hospital beds per 1,000 population
Number of acceptable mental hospital beds per 1,000 population
Number of beds for long-term care for aged per 1,000 population over 65
Special and general patient days of care per 1,000 population
Mental patient days of care per 1,000 population
State and county mental hospital admissions per 100,000 population
State and county mental hospital releases per 1,000 average daily patients
Percent population served by fluorinated water supply
Infant deaths per 1,000 live births

B. Welfare

Child health and welfare
Child welfare expenditure per child under 21
Mothers receiving medical clinic services
Crippled children served
Children receiving child welfare services
Full-time caseworkers per 10,000 children
Vocational rehabilitation
Rehabilitants per 100,000 population
Cases per counselor
Per capita expenditures
Public assistance
Old-age assistance
Aid to families with dependent children

REFERENCES TO APPENDIX

1/ U.S. Department of Health, Education, and Welfare, Office of the Assistant Secretary for Program Coordination, "State Data and State Rankings in Health, Education, and Welfare" (Washington, D.C.: U.S. Government Printing Office, 1965), p. S-6.

2/ The ranking contained in Goal VIII.

3/ The ranking contained in Goal IX under the medical care category.

4/ The ranking contained in Goal IV.

5/ The ranking contained in Goal II.

6/ U.S. Department of Commerce, Bureau of the Census, Characteristics of the Population, Detailed Characteristics, Individual States, 1960.

7/ Unpublished data obtained from the Medical Statistics Agency, Office of the Surgeon General, Department of the Army.

8/ U.S. Department of Health, Education, and Welfare, Public Health Service, National Vital Statistics Division, Vital Statistics of the United States, 1960, Volume II - Mortality Part B, and Forrest E. Linder, and Robert D. Grove, Techniques of Vital Statistics (Washington: U.S. Department of Health, Education, and Welfare, June 1959).

9/ U.S. Department of Commerce, Bureau of the Census, Census of Housing, States and Small Areas, 1960 and "Measuring the Quality of Housing, An Appraisal of Statistics and Methods," working paper No. 25, 1967.

10/ K.E. Taeuber, and A.F., Taeuber, Negroes in Cities (Chicago, Aldine Publishing Company, 1965).

11/ U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States.

12/ "State Data and State Rankings in Health, Education, and Welfare," op. cit., p. S-3.

13/ U.S. Department of Commerce, Bureau of the Census, Census of Governments, 1962, Compendium of Public Employment, p. 83 and p. 107.

14/ Advisory Commission on Intergovernmental Relations, "State Constitutional and Statutory Restrictions on Local Taxing Powers" (Washington, D.C.: October, 1962), Appendix B. States impose a wide variation of limits on their local governments in their power to raise property tax revenues. In the extreme, these limits take the form of constitutional restrictions for specific units of government. Other states have an overall constitutional limitation which allows some flexibility among the various units of government. A less restrictive practice is statutory limits, either general or specific, while a few states impose no limits. To indicate relative differences in tax limitations, the states were ranked according to the following scale:

Type of Restriction	Ranking
No property tax limitation	1
Specific limitations that affect only certain types of local government, which allow considerable flexibility in the application of the limitations, or which provide relatively high maximum rates.	20
Specific limitations applicable to all or to most of their local governments, allowing for little flexibility, or providing relatively low maximum rates.	30
States with overall limitations	40

15/ Advisory Commission on Intergovernment Relations, "State Constitutional and Statutory Restrictions on Local Government Debt" (Washington, D.C.: September 1961), Appendix A. The ranking on debt represents a weighted average of two indicators, the first on debt authorization methods and the second on the nature of the debt limitation with each indicator being weighted equally. States ranked according to their authorizing methods as indicated below:

Type of Restriction	Ranking
Simple action of local governing body	
For all local governments	1
For some local governments	10
By referendum with simple majority of eligible voters participating	20
By referendum with simple majority of property owning voters	30
By referendum with certain limitations, as:	40
Special majority (60%, 67%, 75%, etc.)	
Special majority of property owners	
Majority of ALL eligible voters in the jurisdiction	

The 45 states for which data were available all had some widely applicable legal provisions that set a limit on local full faith and credit debt in relation to the property tax base. For 14 of these states, though, the limits are statutory rather than constitutional. The statutory states were ranked 1, while the constitutional states were ranked 15.

16/ Department of Health, Education, and Welfare, Office of Education, A State Profile on School Dropouts, Juvenile Delinquents, Unemployed Youth, and Related Federal Programs, Fiscal Year 1966.

17/ Statistical Abstract.

Ibid., and Department of Commerce, Bureau of the Census, Current Population Estimates, "Estimates of the Population of States, by Age, 1960 to 1966," Series P-25; No. 384, February 13, 1968.

19/ Department of Health, Education, and Welfare, Office of Education, Residence and Migration of College Students, Fall 1963 (OE-54033, Circular number 783).

20/ Ibid., and Department of Health, Education, and Welfare, Office of Education, Resident and Extension Enrollment in Institutions of Higher Education, Fall 1963 (OE-5400, Circular number 776).

21/ Statistical Abstract, op. cit., p. 330.

22/ U. S. Department of Commerce, Bureau of the Census, Census of Governments, 1962, Compendium of Government Finances, Vol. IV, No. 4, p.56.

23/ U.S. Department of Labor, "Manpower Report of the President," March 1966, p. 208.

24/ The ranking contained in Goal VI.

25/ U.S. Commissioner of Patents, "Annual Report, Fiscal Year 1966," (Washington, D.C.: U.S. Government Printing Office), pp. 28-29.

26/ National Science Foundation, "Reviews of Data on Science Resources," NSF 66-27, No. 9, August, 1966, p. 14.

27/ National Science Foundation, "Basic Research, Applied Research, and Development in Industry, 1964," NSF 66-28, p. 35.

28/ U.S. House of Representatives, 88th Congress, "Hearings Before the Subcommittee on Manned Space Flight of the Committee on Science and Astronautics" (Washington, D.C.: U.S. Government Printing Office, 1963). p. 170 and pp. 720-23.

29/ National Science Foundation, "Reviews of Data on Science Resources," NSF 66-34, No. 11, December 1966, p. 3.

30/ D.A. Murry, "Scientific Research in Missouri" (Columbia, Missouri: Research Center, School of Business and Public Administration, University of Missouri, 1965), pp. 44-47.

31/ "State Data and State Rankings in Health, Education, and Welfare," op. cit., p. S-3 and p. S-42.

32/ U.S. Department of Health, Education, and Welfare, "Vocational and Technical Education, 1964" (Washington, D.C.: U.S. Government Printing Office, 1965), Tables 1 and 5.

33/ U.S. Department of Agriculture, Economic Research Service, "Farm Operator Level of Living Index for Counties of the United States, 1950 and 1959," pp. 29-30.

34/ Advisory Commission on Intergovernmental Relations, "Intergovernmental Relations in the Poverty Program" (Washington, D.C.: April 1966), Tables B-8 and B-9.

35/ U.S. Department of Commerce, Bureau of the Census, U.S. Census of Population, 1960, United States Summary, PC (1)-1C, Table 137.

36/ Statistical Abstract, op.cit., p. 753.

37/ Census of Governments, 1962, Compendium of Government Finances, op. cit., Table 37.

38/ Statistical Abstract, op. cit., p. 149. The "weighted index of crime rates" was calculated from the seven crime rate series published by the FBI--murder and nonnegligent manslaughter, forcible rape, robbery aggravated assult, burglary, larceny, and auto theft. Each series was given equal weight.

39/ U.S. Department of Commerce, Bureau of the Census, County and City Data Book, 1962 (Washington, D.C.: U.S. Government Printing Office, 1962), Tables 3 and 6. This indicator contains two basic elements: first, the ratio of median family income in central cities to that for the SMSA, and second, the level of median family income in the central cities.

Each element was weighted equally in determining the final ranking. All 130 cities with 1960 populations of 100,000 or more were included in the analysis and where the relevant SMSA extended into more than one state, the population was allocated to the relevant state. The ratio was weighted by the absolute level of income to reflect regional income differentials.

40/ Statistical Abstract, op. cit., p. 206.

41/ "State Data and State Rankings in Health, Education, and Welfare," op. cit , pp. S-2, 4, 5, 6, 13.

42/ John G. Grumm, "Structural Determinants of Legislative Output," unpublished paper presented at the Conference on the Measurement of Public Policies in the American States, Ann Arbor, Michigan, July 28--August 3, 1968. The "legislative services score" was constructed by means of a point system by which state legislatures were graded according to such considerations as the extent of the services actually provided, the size of the staff involved, and the degree to which the services were used by the legislators.

REFERENCES

1. Annals of the American Academy of Political and Social Science, "Social Goals and Indicators for American Society," Vols. I and II (May 1967 and September 1967).

2. Arrow, Kenneth, Social Choice and Individual Values (New York: John Wiley and Sons, Inc., 1951).

3. Batchelder, Alan, "Decline in the Relative Income of Negro Men," Quarterly Journal of Economics, Vol. 78 (November 1964), pp. 525-48.

4. Bauer, Raymond A., ed., Social Indicators (Cambridge: M.I.T. Press, 1966).

5. Becker, Gary, The Economics of Discrimination (Chicago: The University of Chicago Press, 1957).

6. Bergson, Abram, "A Reformulation of Certain Aspects of Welfare Economics," Quarterly Journal of Economics (February 1938), pp. 310-34.

7. Blalock, Hubert M., Social Statistics (New York: McGraw-Hill, 1960).

8. Bowles, Samuel, and Levin, Henry M., "The Determinants of Scholastic Achievement--An Appraisal of Some Recent Evidence," The Journal of Human Resources, 3 (Winter 1968), pp. 3-24.

9. Brazer, Harvey E., and David, Martin, "Social and Economic Determinants of the Demand for Education," in Economics of Higher Education, Selma J. Mushkin, ed. (Washington: U.S. Department of Health, Education, and Welfare, Office of Education, 1962), pp. 21-42.

10. Carmichael, Stokely, "What We Want," New York Review of Books, Vol. 7, No. 4 (September 22, 1966), p. 5.

11. Coleman, James S., et al., Equality of Educational Opportunity, U.S. Department of Health, Education, and Welfare, Office of Education (Washington, D.C.: 1966).

12. Coleman, James S., "Equality of Educational Opportunity: Reply to Bowles and Levin," The Journal of Human Resources, 3 (Spring 1968), pp. 237-46.

13. Denison, Edward F., The Sources of Economic Growth in the United States (New York: Committee for Economic Development, January 1962).

14. Drewnowski, Jan, and Wolf, Scott, The Level of Living Index (Geneva: United Nations Research Institute for Social Development, 1966).

15. Dorfman, Robert, ed., Measuring Benefits of Government Investments (Washington: The Brookings Institution, 1965).

16. Eckstein, Otto, "A Survey of the Theory of Public Expenditure Criteria," in Public Finances: Needs, Sources, and Utilization (Princeton: Princeton University Press, 1961).

17. _____, Water Resource Development, The Economics of Project Evaluation (Cambridge: Harvard University Press, 1961).

18. Fellner, William, "Operational Utility: The Theoretical Background and a Measurement," in Ten Economic Studies in the Tradition of Irving Fisher (New York: John Wiley and Sons, Inc., 1967).

19. Gilman, Harry J., "Economic Discrimination and Unemployment," American Economic Review, Vol. 40, No. 5 (December 1965), pp. 1077-96.

20. Harman, Harry J., Modern Factor Analysis, 2nd ed., rev. (Chicago: The University of Chicago Press, 1967).

21. Henderson, James M., "Local Government Expenditures: A Social Welfare Analysis," The Review of Economics and Statistics, Vol. L, No. 2 (May 1968) 1956-63.

22. Kreuger, Anne O., "The Economics of Discrimination," Journal of Political Economy, Vol. 71 (October 1963), pp. 481-86.

23. McKean, Roland N., Efficiency in Government Through Systems Analysis (New York: John Wiley & Sons, Inc., 1958).

24. Michelson, Stephan, Incomes of Racial Minorities, unpublished manuscript (Washington: The Brookings Institution, February 1968).

25. Musgrave, Richard A., The Theory of Public Finance (New York: McGraw-Hill, 1959).

26. Olson, Mancur, Jr., "An Agenda for the Development of Measures of the Progress of a Racial or Ethnic Group," U.S. Department of Health, Education, and Welfare (February 6, 1968), unpublished paper.

27. Report of the President's Commission on National Goals, Goals for Americans (Englewood Cliffs, N.J.: Prentice-Hall 1960).

28. Rothenberg, Jerome, The Measurement of Social Welfare (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1961).

29. Siegel, Paul M., "On the Cost of Being a Negro," Sociological Inquiry, Vol. 35, No. 1 (Winter 1965), pp. 51-57.

30. Taeuber, Karl E., and Taeuber, Alma F., Negroes in Cities (Chicago: Aldine Publishing Company, 1965).

31. Thompson, Wilbur R., A Preface to Urban Economics (Baltimore: Johns Hopkins Press, 1965).

32. U.S. Civil Rights Commission, Racial Isolation in the Public Schools (Washington, D.C.: 1967).